

What is Claimed is:

1. A medical device and position sensor combination comprising:

(a) a medical device having a body;

(b) a position sensor attached to the body, the position sensor having a core made of a Wiegand effect material, and a winding circumferentially positioned around the core.

2. The combination according to Claim 1, wherein the winding is attached to the core.

3. The combination according to Claim 1, wherein the position sensor is used to determine position coordinates.

4. The combination according to Claim 3, wherein the position sensor is also used to determine orientation coordinates.

5. The combination according to Claim 1, wherein the position sensor maintains accuracy of  $\leq 1$  mm at temperatures greater than  $75^{\circ}\text{C}$ .

6. The combination according to Claim 5, wherein the position sensor maintains accuracy of  $\leq 1$  mm at temperatures at approximately  $80^{\circ}\text{C}$ .

7. The combination according to Claim 1, wherein the core has an outer diameter less than approximately 0.3mm.

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8. The combination according to Claim 7, wherein the core has an outer diameter of about 0.25 mm.

9. The combination according to Claim 8, wherein the winding is attached to the core.

10. The combination according to Claim 9, wherein a combination of the core and the winding has an outer diameter less than approximately 0.5 mm.

11. The combination according to Claim 10, wherein the combination of the core and the winding have an outer diameter of about 0.4 mm.

12. The combination according to Claim 11, wherein the material of the core comprises cobalt.

13. The combination according to Claim 12, wherein the material of the core further comprises vanadium.

14. The combination according to Claim 13, wherein the material of the core further comprises iron.

15. The combination according to Claim 14, wherein the material of the core comprises approximately 20%-80% cobalt.

5 16. The combination according to Claim 14, wherein the material of the core comprises approximately 2%-20% vanadium.

10 17. The combination according to Claim 14, wherein the material of the core comprises approximately 25%-50% iron.

15 18. The combination according to Claim 14, wherein the material of the core comprises approximately 52% cobalt, 10% vanadium and 38% iron.

19. The combination according to Claim 9, wherein the winding is made of copper.

20 20. The combination according to Claim 4, wherein the position sensor has an accuracy within approximately 0.5 mm.

21. A medical device and position sensor combination comprising:

(a) a medical device having a body;

(b) a position sensor attached to the body, the position sensor having a core made of a high permeable material, the material being a magnetic material that produces a magnetic field that switches polarity and causes a substantially uniform voltage pulse upon an application of an external field.

22. The combination according to Claim 21, wherein the position sensor further includes a winding positioned around the core.

23. The combination according to Claim 1, wherein the winding is attached to the core.

24. The combination according to Claim 21, wherein the position sensor is used to determine position coordinates.

25. The combination according to Claim 24, wherein the position sensor is also used to determine orientation coordinates.

26. The combination according to Claim 21, wherein the position sensor maintains accuracy at  $\leq 1$  mm at temperatures greater than 75°C.

27. The combination according to Claim 26, wherein the position sensor maintains accuracy at  $\leq 1$  mm at temperatures at approximately 80°C.

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28. The combination according to Claim 21, wherein the core has an outer diameter less than approximately 0.3mm.

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29. The combination according to Claim 28, wherein the core has an outer diameter of about 0.25 mm.

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30. The combination according to Claim 29, wherein the winding is made of wire.

31. The combination according to Claim 30, wherein a combination of the core and the winding has an outer diameter less than approximately 0.5 mm.

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32. The combination according to Claim 31, wherein the combination of the core and the winding have an outer diameter of about 0.4 mm.

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33. The combination according to Claim 32, wherein the material of the core comprises cobalt.

34. The combination according to Claim 33, wherein the material of the core further comprises vanadium.

35. The combination according to Claim 34, wherein the material of the core further comprises iron.

5 36. The combination according to Claim 35, wherein the material of the core comprises approximately 20%-80% cobalt.

10 37. The combination according to Claim 35, wherein the material of the core comprises approximately 2%-20% vanadium.

15 38. The combination according to Claim 35, wherein the material of the core comprises approximately 25%-50% iron.

20 39. The combination according to Claim 35, wherein the material of the core comprises approximately 52% cobalt, 10% vanadium and 38% iron.

40. The combination according to Claim 30, wherein the wire winding is made of copper.

25 41. The combination according to Claim 25, wherein the position sensor has an accuracy within approximately 0.5 mm.

42. The combination according to Claim 21 wherein the material of the core comprises a copper, nickel and iron alloy (CuNiFe).

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43. The combination according to Claim 21, wherein the material of the core comprises an iron, chrome and cobalt alloy.

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